CFPUA Action Plan to Implement Gen-X Response Measures

October 2, 2017

Cape Fear Public Utility Authority

1. Became operational July 1, 2008
2. Service area includes approximately 68,000 customer accounts
3. Richardson Nanofiltration Plant operational 2009, permitted capacity of 6 mgd, supplied by 25 wells
4. Sweeney WTP upgraded 2012, permitted capacity of 35 mgd, surface water facility
5. 23 mgd raw water purchase agreement with LCFWASA

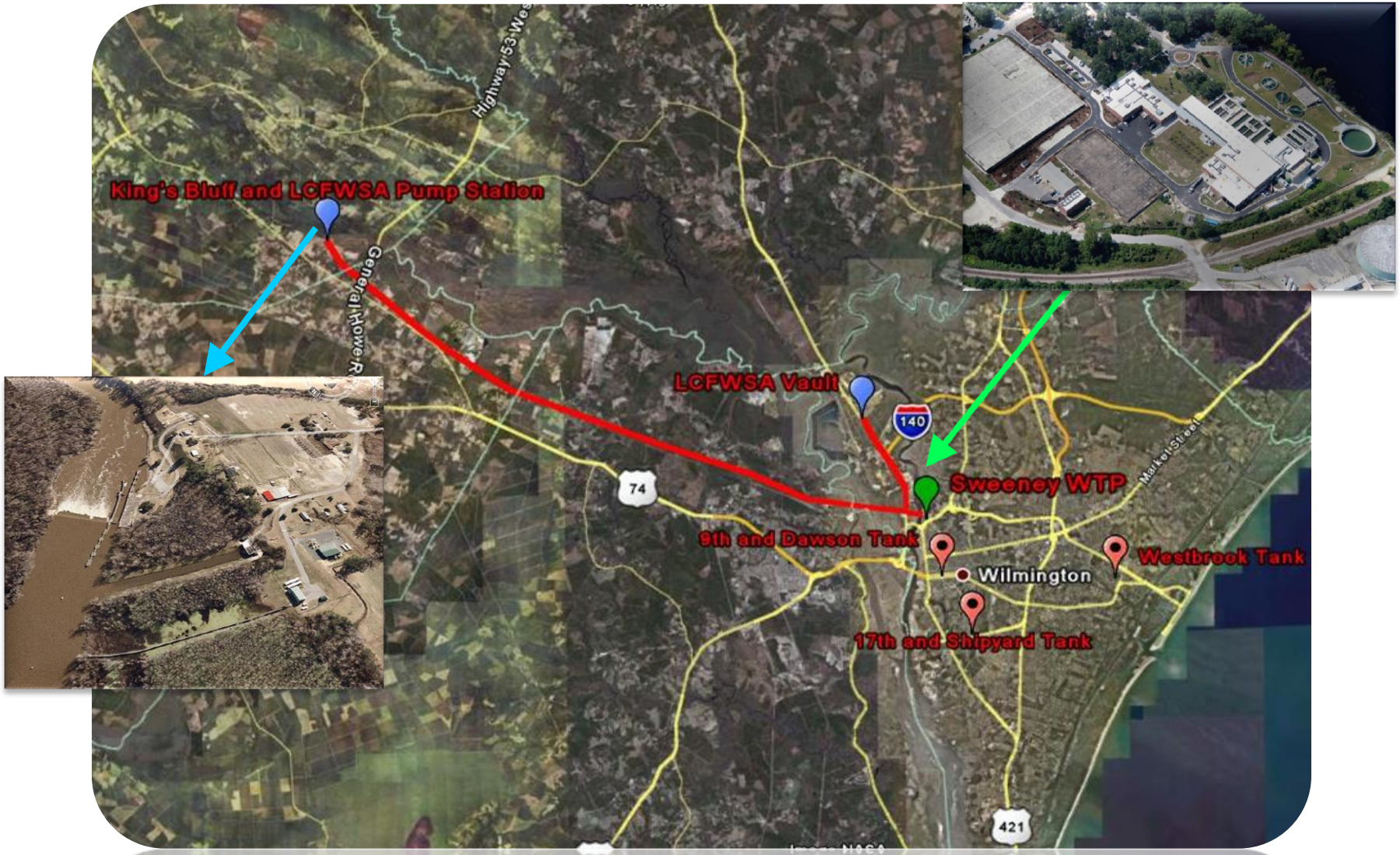
Gen-X Response Measures

1. UNCW Support
2. Water treatment alternative evaluation for removing PFASs, Gen-X and emerging compounds
3. Aquifer Storage and Recovery Program

University of North Carolina Wilmington Research and Support

• Identify Compounds in raw water	$ 75,000	
• Study river sediment & other compounds	$ 150,000	(FUTURE)
• Evaluate compounds in finished water	$ 75,000	(FUTURE)
Total =	**$300,000**	

Raw Water System

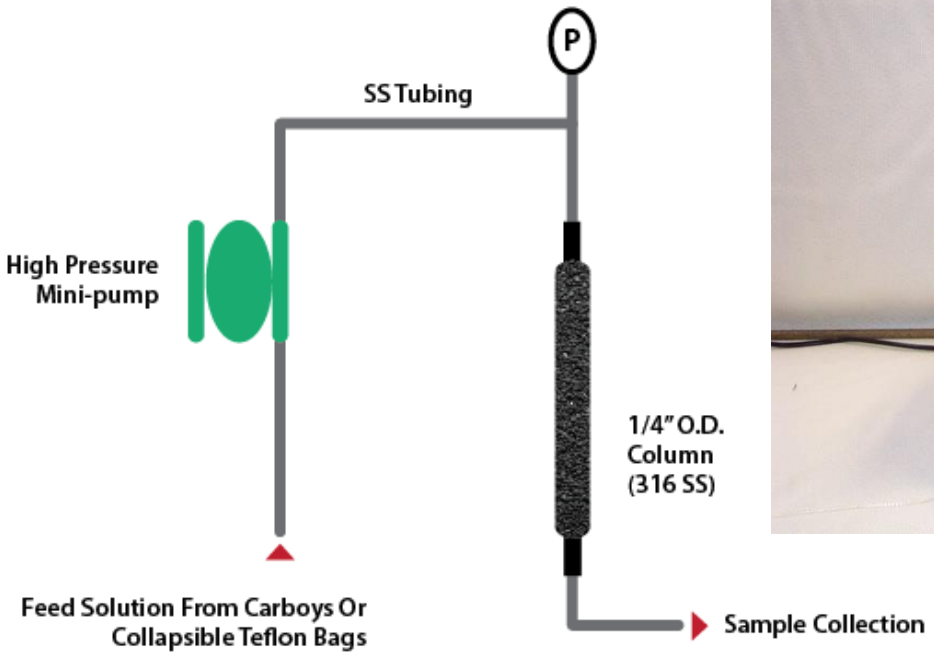


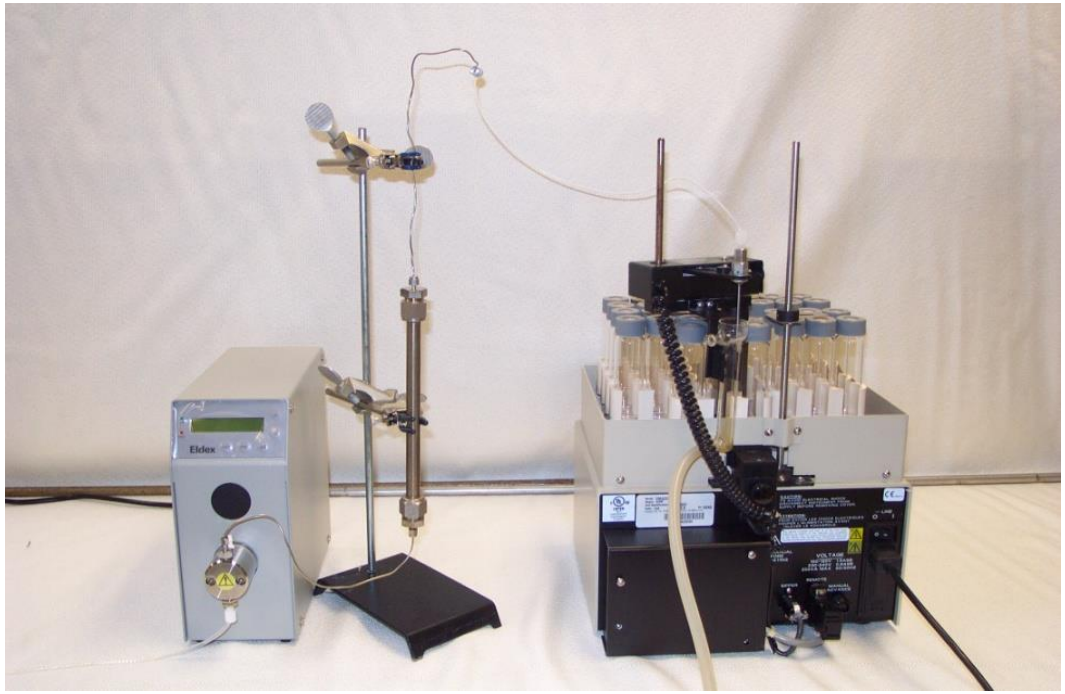
Sweeney Water Treatment Plant

GAC Pilot Testing

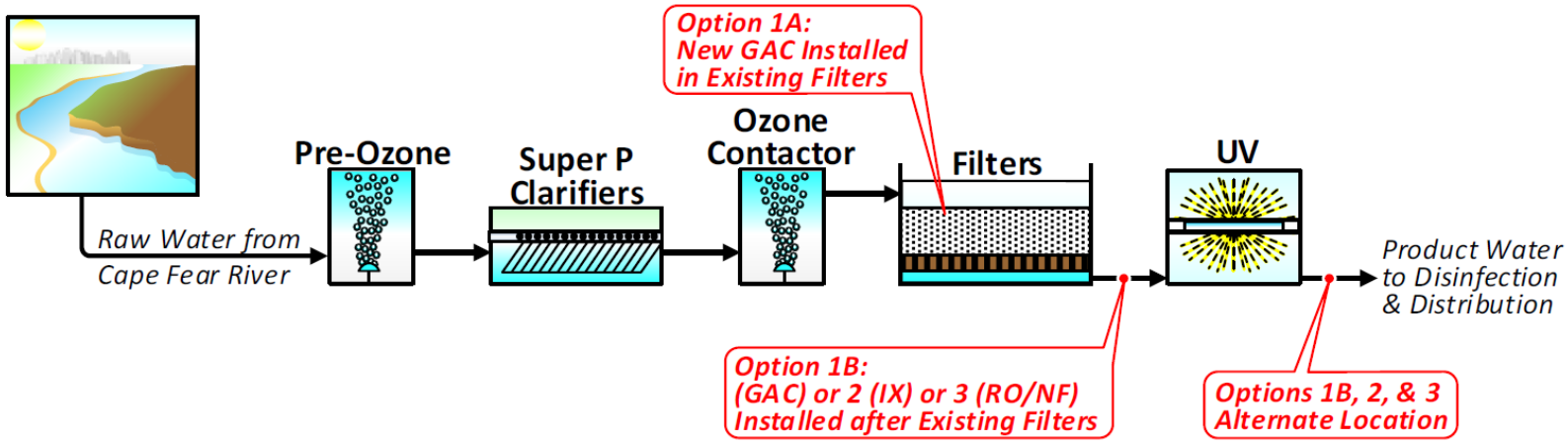
Ion-Exchange Resin Testing

Accelerated Column Test (ACT)





Location of Options on Treatment Process Diagram



Treatment Evaluation Cost Estimates

- Treatment Option Evaluation $ 50,000
- Testing costs $ 40,000

Total = $ 90,000

Summary

DESCRIPTION	GAC in Existing Filters	OPT 1-B, GAC Contactors Post-Filtration	Deep Bed Version of 1B	RO/NF Post-Filtration
Initial Cost	$1.7 million	$28 million	$32 million	$113 million
Annual Operating Costs	$2.0 million minimum	$3.3 million to $6.3 million	$3.4 million to $6.4 million/yr	$3.3 million/yr

- GAC operating costs are based on 6,000 to 12,000 Bed Volumes (BV) based on experience elsewhere with PFAS removal, but not Gen-X. Site specific GAC testing is being conducted to determine the correct BV to assume for treating Cape Fear River water.
- Option 1A's initial cost includes an initial load of GAC media and one-time replacement of sand and gravel. (e) The options would have higher initial costs if standby filters/contactors were added to provide full capacity when units are off-line during GAC replacement events.
- A detailed cost opinion was not prepared for Ion Exchange (IX); however, it is the engineer's opinion that TPW for IX would be roughly in line with Post GAC. As a contingency CFPUA is conducting IX testing.

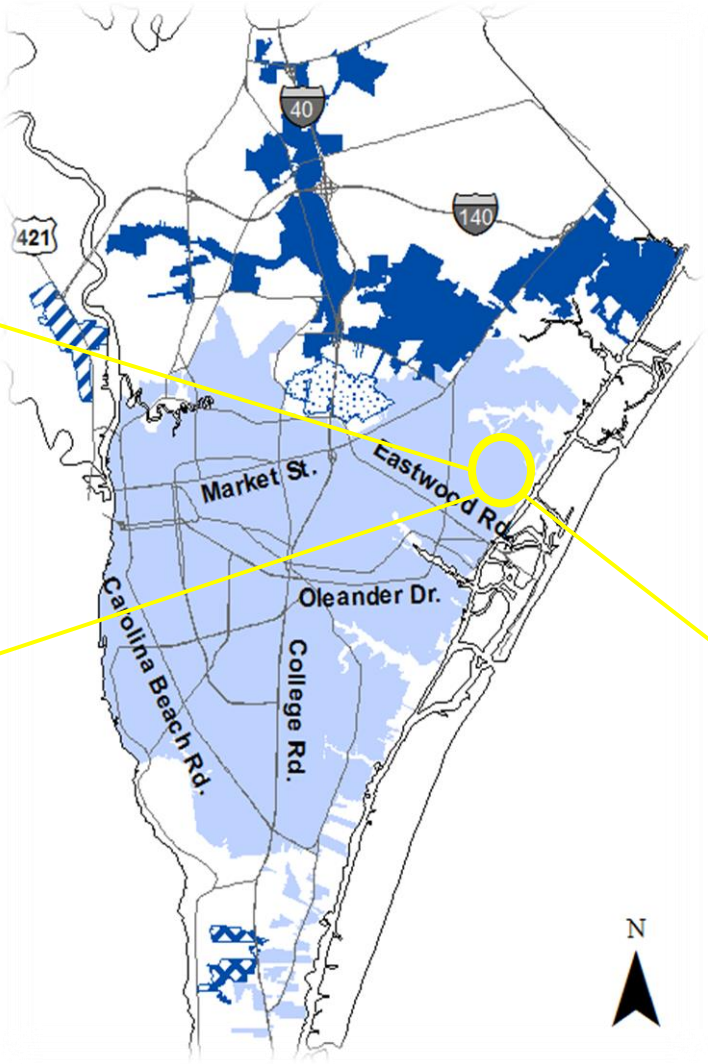
Aquifer Storage and Recovery (ASR)

- Cost effective seasonal storage of finished water
- Capacity – 0.75 MGD or 750,000 gallons/day
- Store water in PeeDee Aquifer at 140 to 185 ft.

<u>Benefits</u>

- Peak demand source
- Water quality
- Emergency supply

ASR Well


40
140
421
Market St.
Eastwood Rd.
Oleander Dr.
College Rd.
Carolina Beach Rd.
N

ASR Temporary Withdrawal and Discharge to Sewer

- **50 million gallons stored drinking water from surface water source containing Gen-X**
  - Groundwater at CFPUA ASR Well was 830 ppt Gen-X on June 22nd
  - Groundwater at Wrightsville Beach Well #11 was 26 ppt Gen-X on June 22nd
  - Wrightsville Beach Well #11 is approximately 3,400 feet east of CFPUA ASR Well
- **Temporary discharge piping and additional monitoring wells were installed**
  - Installed temporary discharge piping from CFPUA ASR Well to sanitary sewer
  - Installed two new monitoring wells and sampled all for Gen-X to establish baseline
  - Pumping ASR groundwater to WWTP: Effluent is under 140 ppt health limit
- **Began withdrawal from CFPUA ASR Well at 500 gpm September 20th**
  - Currently highest level in any production or monitoring well is 91 ppt at ASR site
  - Drawdown cone of influence reaches Wrightsville Beach Well #11
  - Pump until 50 million gallons have been withdrawn, with periodic sampling

ASR Program Cost Estimates*

- Engineering $ 100,000
- Construction, testing & Monitoring $ 500,000

Total = $ 600,000

***** *Not including value of treated water or cost to treat water removed from aquifer*

Summary of Anticipated Short Term Costs*

Water treatment evaluation	$ 90,000
UNCW support	$ 300,000
ASR remediation	$ 600,000
Ongoing Gen-X Monitoring at Sweeney	$ 85,000
	Total = $ 1,075,000

** Costs do not include permanent upgrades to Sweeney Plant*

Cape Fear Public Utility Authority

Jim Flechtner, PE
Executive Director

Frank Styers, PE
Chief Operations Officer

Ben Kearns
Water Operations Supervisor